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CHRONOLOGICAL DEVELOPMENT OF THE SOLID PROPELLANT ROCKET MOTOR PRODUCTION AND TEST FACILITIES KEMEROVO, USSR

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JUNE 1967

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PHOTOGRAPHIC INTERPRETATION REPORT

CHRONOLOGICAL DEVELOPMENT OF THE SOLID PROPELLANT ROCKET MOTOR PRODUCTION AND TEST FACILITIES KEMEROVO, USSR

JUNE 1967

NATIONAL PHOTOGRAPHIC INTERPRETATION CENTER

SUMMARY

This report is a study of the development of solid propellant facilities at the Ammunition Loading and Explosives Plant Raketa 392 and the associated Solid Propellant Rocket Motor Test Facility at Kemerovo, USSR. The first section of the report is a detailed construction chronology of the Advanced Solid Propellant Production Facility from [redacted] when it was first observed on photography to [redacted] when it was probably operational; the chronology is followed by a comprehensive description of significant sections and structures within the advanced propellant facility, incorporating the rationale for the interpretation that composite-type propellants are produced in the facility. The next section discusses the test facility, and the final section summarizes the activities within the remainder of Plant 392.

INTRODUCTION

The Ammunition Loading and Explosives Plant Raketa 392 [redacted] is located on the north bank of the Tom River in the outskirts of Kemerovo, USSR (Figure 1). The Advanced Solid Propellant Production Facility [redacted] Kemerovo Solid Motor Production Plant) is located at 55-24N 085-59E in the northeast section of Plant 392, receiving steam, water, and logistical support from the plant. Testing operations are conducted at the separately secured Kemerovo Solid Propellant Rocket Motor Test Facility located approximately 0.4 nautical miles north of the advanced propellant area (Figure 2).

Plant 392 reportedly was constructed in 1939, expanded in 1941 by the addition of equipment from other Soviet plants, and damaged by an accidental explosion prior to 1945. Repair of the damage and continued expansion resulted in extensive new construction between 1945 and 1950. Products of Plant 392 include nitrocellulose propellants, TNT, gunpowder, ammonium nitrate mixtures, and mercury fulminate; during World War II its production reportedly included rockets of the "Katyusha" barrage-type and grenades.1/ Two large chemical combines are located near Plant 392 and possibly support it. The first is the Kemerovo 18th Session VKP Nitrate Fertilizer Plant, including Chemical Combine 510, located south of the Tom River at 55-22N 086-02E; this plant reportedly produces ammonia, ammonium nitrate, nitric acid, and caprolactam. 2/ The Basic Encyclopedia lists this combine as Kemerovo Nitrogen Combine 18th Session VKP, [redacted]. The second nearby plant is the Novo Kemerovo Chemical Combine, also located south of the Tom River, at 55-20N 086-05E; this combine reportedly produces caprolactam, nitric acid, and ammonium nitrate. 3/ Caprolactam is a plasticizer also used in solid propellant production for curing polyurethanes.

The designation of the Advanced Solid Propellant Production Facility was derived from an analysis of the entire plant. Specific structures have been compared with similar ones in the Advanced Solid Propellant Production Area of Chemical Combine 101 at Kamensk-Shakhtinskiy, USSR, 4/ and in the Advanced Solid Propellant Production Facility of Munitions and Chemical Combine K. Kirov 98 at Perm, USSR. 5/ Other comparisons have been made with areas and structures at identified solid propellant testing and production facilities throughout the USSR. 6-8/

The tables associated with the line drawings in this report present chronological and mensural data derived from [redacted] photography of the plant from [redacted] through [redacted] functional identifications are based entirely on photographic interpretation. The determination of dates when first observed and apparently complete is based on intermittent photographic coverage, often of small scale and poor interpretability. Because no photography was obtained in 1963, it has not been possible to determine the exact construction and completion dates of some buildings; buildings reported complete in [redacted] may actually have been complete at a much earlier time.

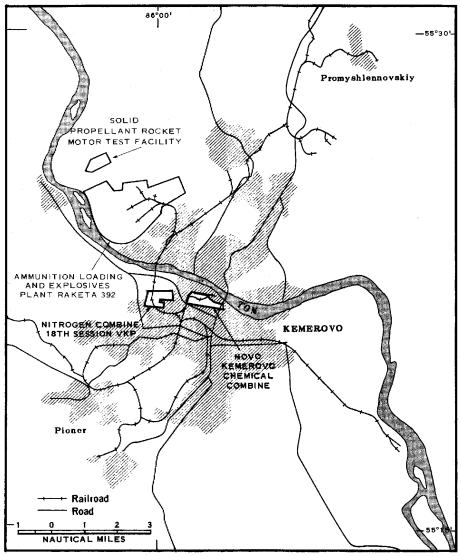


FIGURE 1. LOCATION MAP.

MAJOR DEVELOPMENTS AT ADVANCED SOLID PROPELLANT PRODUCTION FACILITY, 1961-1966

1961

The first [redacted] photography of the Advanced Solid Propellant Production Facility was obtained in [redacted] when the facility was in an early stage of construction. Although this photography was of only fair interpretability, it did permit observation of 6 complete buildings (items 10, 15-18, and 30, Figure 3) and 6 buildings under construction. No other signs of building construction were visible, and no indications of rail spurs or security fences were evident.

1962

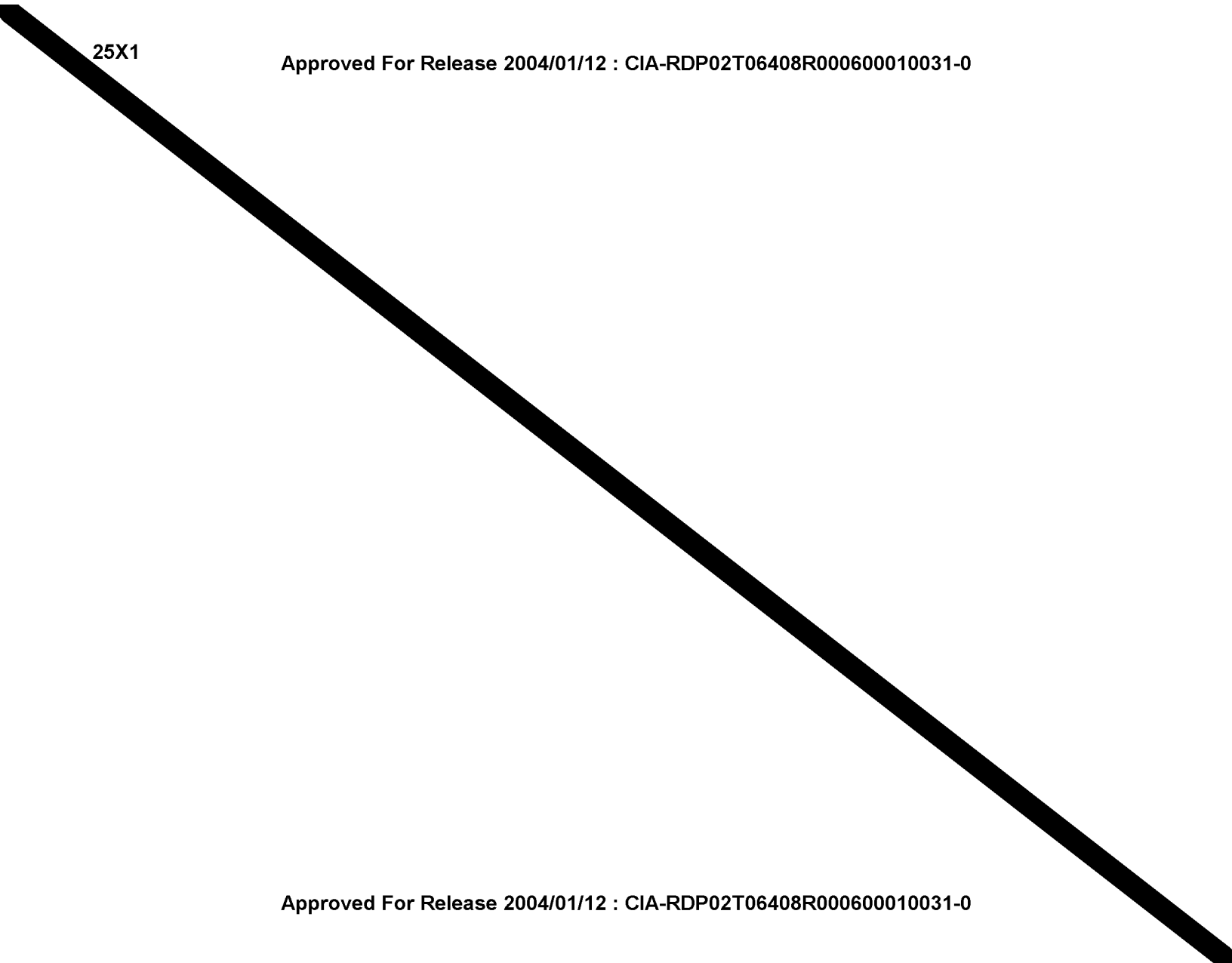
Photography of the facility was obtained 5 times during 1962, in the months of [redacted] Construction was proceeding at a fairly rapid pace; a total of 15 more structures (see Table 1) had been completed, and construction had begun on 2 other buildings. Railbed construction had been started by [redacted] and preliminary security fences were visible.

1963

No usable [redacted] photography of Kemerovo was obtained between [redacted] The number of buildings that were first observed and also appeared complete in [redacted] indicates that construction continued at a rapid pace during the 14-month interval.

1964

Eight buildings appeared complete when they were first observed in [redacted] and 8 more buildings were completed during the year. The facility appeared to be approaching an



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operational status; security fences, rail spurs, steamlines, and possible water lines were apparently nearing completion.

1965

Two additional support buildings were first observed early in the year and appeared complete by [redacted] A possible motor case inspection/storage building (item 28) was either removed or destroyed between [redacted] an incident of this type could indicate that the plant was then in operation. A similar occurrence took place at Kamensk-Shakhtinskiy, where a blend/mix building was completely destroyed in 1965 and later rebuilt. 4/

1966

The first large-scale, stereo photography of Kemerovo in almost 2 years was obtained in [redacted] permitting the confirmation of completed rail spurs and steamlines. During the fall, a possible rocket motor case measuring [redacted] feet was observed near Building 25, and 2 rail cars/motor dollies were seen on the spurs entering the curing buildings; 1 car/dolly measuring [redacted] was seen near Building 17, and another measuring [redacted] was visible outside Building 15. Because of its greater height, Building 15 is possibly used for larger motors. The presence of rail cars/dollies and a possible rocket motor case may indicate that production had begun by the fall of 1966.

PRINCIPAL STRUCTURES AT ADVANCED SOLID PROPELLANT PRODUCTION FACILITY

Table 1 presents an interpretation of the functions, as well as dimensions and chronology, of the majority of the structures in the Advanced Solid Propellant Production Facility. The buildings and functional areas described below are those which are considered necessary to the production of composite solid propellants or which appeared significant enough to warrant a detailed discussion. All item numbers are keyed to Figure 3 and Table 1.

PROPELLANT PREPARATION BUILDINGS

The propellant preparation buildings are located in the north-central part of the facility; buildings of this type could be used for premixing fuel and preparing oxidizer. Other ingredients including binder, curative, plasticizer, catalyst, and possibly an additive such as powdered aluminum are apparently delivered by rail to the ingredients storage buildings (items 38 and 41). From there, they would be transferred to 2 probable premix buildings (items 29 and 34). Overhead pipeline galleries/conveyers connect the ingredients storage buildings with the probable premix buildings, continue to the blend/mix buildings (items 21 and 23), and end at the casting/curing buildings (items 19, 20, and 22). Multiple pipelines of this type would ordinarily be expected to carry water, air, and steam rather than ingredients; however, in this facility the lines originate at the ingredients storage buildings instead of at boilerhouses or compressor buildings. The oxidizer is brought in by rail to the possible oxidizer storage buildings (items 39 and 40); transfer from these structures to the blend/mix buildings is probably by a vehicle of some type.

PROPELLANT BLEND/MIX BUILDINGS

Various ingredients including oxidizer, curative, liquid polymer binder, plasticizer, and catalyst are combined in the 2 heavily revetted blend/mix buildings (items 21 and 23) in the northern part of the facility; Figure 4 presents a perspective view of Building 21. Remote control of the blend/mix operation may take place from an earth-covered bunker located southeast of Building 23. Each blend/mix building is surrounded by a massive earthen revetment with 1 opening [redacted] large enough to permit vehicular traffic to enter and leave the enclosure; it appears likely that oxidizer is delivered through these openings/tunnels. In addition to service pipelines which extend over the tops of the revetments, overhead pipeline galleries/conveyers pass through the revetment at Building 21 in 3 places and through that of Building 23 in 2 places. These pipeline galleries/conveyers could carry water, steam, compressed air, or possibly some ingredients; a gallery/conveyer from the ingredients storage and the premix buildings enters the south side of each blend/mix building. At present, it cannot be determined whether the mixed propellant is moved via pipeline or road to the casting/curing buildings. It is possible that these overhead galleries are ramp-type conveyers; sealable containers could be loaded at the blend/mix buildings and transported to the casting pits via a conveyer system.

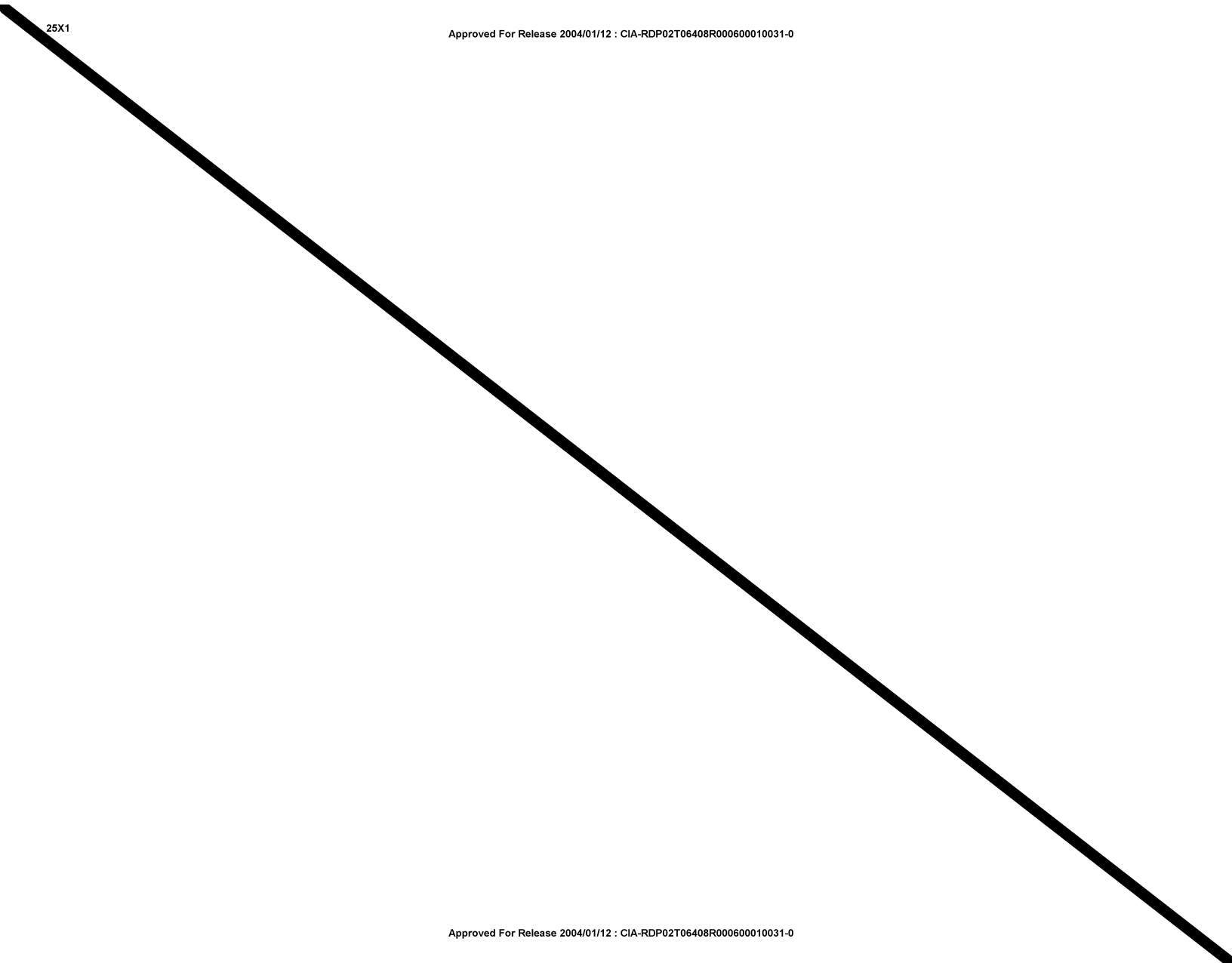
Virtually identical blend/mix buildings have been identified in the advanced propellant areas at both Kamensk-Shakhtinskiy and Perm. 4,5/

CASE PREPARATION SECTION

The inspection and cleaning of rocket motor cases, the installation of linings, and work preparatory to casting appears to be performed in the large high-bay building (item 37) in the southeast corner of the facility. Figure 5 presents a perspective view of this structure, which consists of 2 bays--a main section to the south incorporating a central high bay which possibly houses a traveling crane for offloading rail cars, and a north high bay possibly used for work on large-diameter cases. A single rail spur serves the south end of the main section, and southeast of the case preparation building is an associated rail-served possible case storage building/warehouse (item 36). Similar case preparation and associated storage buildings have been identified at both Kamensk-Shakhtinskiy and Perm, 4,5/ although at Perm the case preparation building does not have a high-bay section.

CASTING/CURING BUILDINGS

The newly mixed propellant is transferred to the 3 heavily revetted casting/curing buildings (items 19, 20 and 22) along the northern edge of the facility; Figure 6 presents a perspective view of Building 22. Each casting/curing building consists of a rectangular structure measuring approximately 150 by 35 feet by 40 feet high enclosed by a large earthen revetment; observation of comparable structures elsewhere in the USSR would indicate that an L-shaped building is located under the revetment, and a passageway probably connects this L-shaped building to the casting structure. A high section on the casting building may contain an elevator to convey containers from the pipeline gallery/conveyer level to the casting pits. Only 1 entrance to each revetment, a rail-served tunnel measuring approximately [redacted] is visible on the available photography, although small personnel entrances may be present. It is believed that after casting, the rocket motors are moved by rail to the 4 multibay in-line curing buildings (items 15-18), located south and southwest of the casting/curing buildings and served by rail spurs. The distances by rail from the casting pits to the curing bays range from 800 to 2,000 feet.



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CURING BUILDINGS

The 4 in-line curing buildings are rectangular in shape, with a high section in the front divided into bays; a single narrow-gauge rail spur serves each bay from a main switch. The high front section may house either a hoisting mechanism or roll-up doors for the fronts of the bays; the latter appears more likely, because the newly cast motors probably remain on the transport dollies. Figure 7 presents a perspective view of Building 18. Three of the buildings (items 16-18) are divided into 6 bays, with the high section measuring [redacted]. The fourth building (item 15) has 5 bays and is [redacted] at the higher end; this may indicate that this building is used for larger motors than the other three.

A possible curing building (item 11) is located in the northwest corner of the facility; this building also appears in perspective view on Figure 7. Building 11 is served by a single narrow-gauge rail spur which passes the backs of the assembly buildings (items 5 and 7). The possible curing building is divided into 4 bays by possible transverse blast walls that extend above the roof line; each bay appears to be equipped with an overhead crane serving the rail spur. Apparently only small items could be moved by this system. The relatively small size of this building, its handling capacity, and the location tend to indicate that only small items, possibly aft closures, may be cured here. Similar buildings are located at Kamensk-Shakhtinskiy and Perm. 4,5/

Table 1. Functions, Dimensions, and Chronology of Structures in the Advanced Solid Propellant Production Facility (Item numbers are keyed to Figure 3)

Item	Function	Dimensions (ft) Length	Width	Height	Roof Cover (sq ft)	First Observed	Apparently Complete	Explanatory Notes
1	Poss laboratory/quality test							
2	Support							
3	Support							
4	Storage/shipping							
5	Prefinal assembly							
6	Storage/shipping							
7	Prefinal assembly							
8	Support							
9	Poss ingredients storage							
10	Poss ingredients storage							
11	Poss curing							Not present [redacted]
12	Support							
13	Support							
14	Poss quality control							
15	Curing							Greater height than item 5 may indicate use for larger motors
16	Curing							Revetted; not present [redacted]
17	Curing							Revetted; not present
18	Curing							Revetted
19	Casting/curing							Not present [redacted] single rail spur & small bridge crane may indicate use for small-diameter castings
20	Casting/curing							
21	Blend/mix							
22	Casting/curing							Not present [redacted] may be post-curing inspection building
23	Blend/mix							Greater height than items 16 & 17 may indicate use for larger castings
24	U/I							
25	U/I							
26	Poss inspection							Has 6 rail-served bays
	High bay							
	Low shed							
27	Poss inspection							Connected by pipeline gallery/conveyor to items 19 & 20
28	Poss inspection/storage							
29	Prob premix							Connected by pipeline gallery/conveyor to item 22
30	U/I							
31	Support							Rail served
32	Support							Rail served; revetted
33	Support							
34	Prob premix							
35	Bridge crane							Rail served; revetted
36	Poss case storage/warehouse							Removed or destroyed between [redacted]
37	Case preparation							
	North high bay							Not present [redacted]
	Main section							
	Central high bay							Not present [redacted]
38	Ingredients storage							
39	Poss oxidizer storage							Rail spur aligned with this section indicating prob craneway
40	Poss oxidizer storage							Connected by pipeline gallery/conveyor to items 28 & 29
41	Ingredients storage							Connected by prob conveyor to item 40
42	Support							Connected by prob conveyor to item 39

*Apparently complete when first observed.
**Overall dimension of irregular structure.

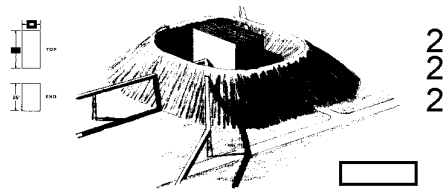

FIGURE 4. PERSPECTIVE VIEW AND DIMENSIONS OF PROPELLANT BLEND/MIX BUILDING (item 21, Figure 3).

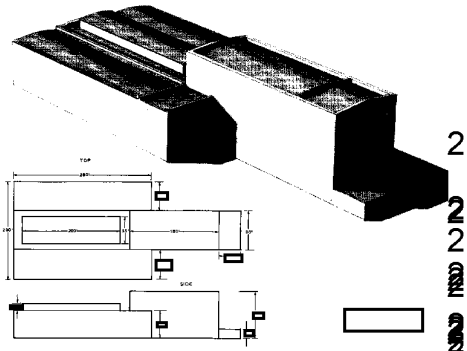

FIGURE 5. PERSPECTIVE VIEW AND DIMENSIONS OF CASE PREPARATION BUILDING (item 37, Figure 3).

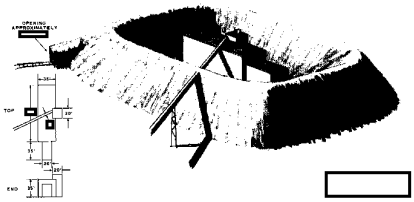

FIGURE 6. PERSPECTIVE VIEW AND DIMENSIONS OF CASTING/CURING BUILDING (item 22, Figure 3).

ASSEMBLY BUILDINGS

The cast and cured motors apparently are assembled in the westernmost section of the facility; this section contains 2 large and 2 somewhat smaller rectangular buildings (items 4-7). The 2 larger buildings (items 5 and 7), both rail served, appear to be used for prefinal assembly (i.e. mandrel removal, grain trim, and installation of the aft closures). The smaller rail-served buildings (items 4 and 6) may be used for in-process storage for the assembly buildings or could possibly be packing and shipping points for the assembled rocket motors.

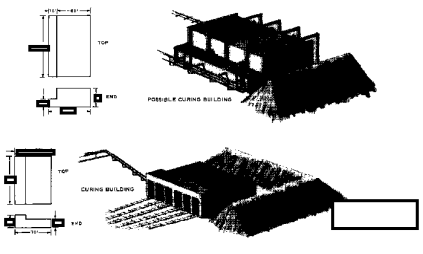

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FIGURE 7. PERSPECTIVE VIEWS AND DIMENSIONS OF CURING BUILDING (item 18, Figure 3) AND POSSIBLE CURING BUILDING (item 11).

POSSIBLE INSPECTION AND TEST BUILDINGS

Two partially revetted structures located in the south-central section of the facility (items 26 and 27) may be used in some type of inspection or quality control operation normally associated with the production of solid propellant rocket motors. Figure 8 presents a perspective view of Building 27. These buildings are rectangular, with a low shed along the west side. An L-shaped revetment protects the north and east sides of each building, and a large concrete slab wall extends along the west side, continuing into the revetment. The result of this design would apparently be to direct any blowout toward the L-shaped revetment. Buildings of this type are present at both Kamensk-Shakhtinskiy and Perm.4,5/

25X1

One building (item 1 and Figure 9) does not fit the flow pattern of a composite propellant production facility. This structure is a large multistory building located in an offset area on the western side of the facility. The lower end of the building incorporates 4 small bays/flues on the north side, protected by a revetment. This structure is believed to be a possible laboratory/quality test building.

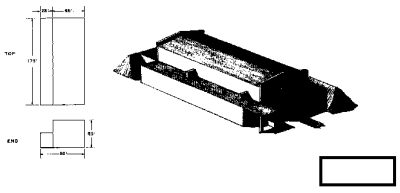

FIGURE 8. PERSPECTIVE VIEW AND DIMENSIONS OF POSSIBLE INSPECTION BUILDING (item 27, Figure 3).

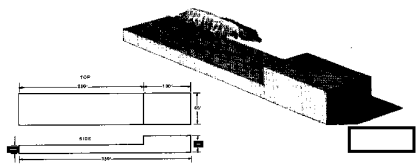

FIGURE 9. PERSPECTIVE VIEW AND DIMENSIONS OF POSSIBLE LABORATORY/QUALITY TEST BUILDING (item 1, Figure 3).

SOLID PROPELLANT ROCKET MOTOR TEST FACILITY

The Solid Propellant Rocket Motor Test Facility is located in a separately secured, rail-served area north of the Advanced Solid Propellant Production Facility (Figure 2). In the following discussion, all item numbers are keyed to Figure 10 and Table 2.

The test facility was observed in the early stages of construction in [redacted] At that time the east-west leg of the L-shaped revetment (item 14) was under construction; other visible structures included the revetted building (item 10) west of the L-shaped revetment and 2 other buildings under construction, both now separated from the rest of the facility by a security fence added after 1962. No [redacted] photography of Kemerovo was obtained between [redacted].

By [redacted] the L-shaped revetment appeared to be nearing completion, and 8 more buildings were present in various stages of construction. No significant changes had taken place by [redacted] although construction had progressed on the rail spur into the facility. The first large-scale photography, in [redacted] permitted a more detailed interpretation; the security fence, steamline, and blast deflector (earlier designated the L-shaped revetment) appeared to be complete. The railbeds also appeared complete, but it could not be determined if the rails were present. The possible small rocket motor test building (item 4), served by 3 rail spurs, appeared near completion, and the large horizontal test building (item 13) was in the early stage of construction. The presence of construction materials/pieces of equipment indicated that construction activity was continuing in the facility.

By [redacted] construction was well under way on a high-bay building (item 3); comparable structures have been observed in the test areas at Perm and Kamensk-Shakhtinskiy.6/ No significant changes were seen until [redacted] when the large horizontal test building and the high-bay building appeared to be in the midstage of construction. By [redacted] the facility as a whole appeared to be in the late stages of construction.

25X1

The most significant structure in the facility is the large horizontal test building, which is of a different configuration from those seen at the other Soviet solid propellant facilities.6/ The components of the test building at Kemerovo are arranged in a straight line, as opposed to the L-shaped arrangement observed at the other sites. This building and 3 other important structures in the test facility are described in more detail below.

25X1 25X1

HORIZONTAL TEST BUILDING

The largest structures in the test facility are the horizontal test building and its associated blast deflector (items 13 and 14); both structures appear in perspective view on Figure 11. The main section of the building, housing the principal test cell, measures [redacted] attached to the main section by a 25-foot-

25X1 wide structure is a section measuring which houses a smaller test cell. The 2 cells are served at the front by separate rail spurs. This front loading system is similar to the practice at the Perm, Biysk, Sterlitamak, Krasnoyarsk, and Kamensk-Shakhtinskiy test facilities.6/

The Kemerovo test building, however, differs from those at the facilities mentioned above in several ways. The Kemerovo building has a large overhead traveling crane measuring 25X1 feet; it is possible that the motors are brought in by rail, test-fired, and then loaded on a motor vehicle for removal. The expanding tubular projection that extends toward the blast deflector at the other 5 large horizontal test buildings is not present at this one. The blast deflector at Kemerovo, located approximately 240 feet east of the test building, is L-shaped, as opposed to the semi-elliptical shape of the other deflectors. A rail spur terminates at the northwest corner of the L-shaped deflector, possibly indicating the presence of a storage bunker/holding

Table 2. Functions, Dimensions, and Chronology of Structures in the Solid Propellant Rocket Motor Test Facility (Item numbers are keyed to Figure 10)

Item	Function	Dimensions (ft)			Roof Cover (sq ft)	First Observed	Explanatory Notes
		Length	Width	Height			
1	Support						Apparently complete
2	Support						Apparently complete
3	Vertical checkout/assembly						Prob complete
4	Poss small rocket motor test						Apparently complete
5	Support						Apparently complete
6	Support						Apparently complete
7	Storage						Apparently complete
8	Poss inspection						Apparently complete low shed on SE side under construction until
9	Poss boilerhouse						Prob complete ; connected by pipeline to items 10 & 13
10	Prob control						Apparently complete ; poss cabletray/walkway connects to items 13 & 9
11	Support						Prob complete
12	Poss inspection/storage						Apparently complete
13	Large horizontal test						Prob complete
14	Blast deflector						Deflector complete facing not added until

*Overall dimensions of irregular structure.

position for the rocket motors. Finally, Kemerovo is the only one of the test facilities where 2 firing positions use the same blast deflector. The smaller section of the test building is analogous to the smaller horizontal test positions at Krasnoyarsk 7/ and Biysk;8/ although the general sizes of the 3 cells/buildings are comparable, the smaller section at Kemerovo is rectangularly shaped, in contrast to the irregular shape of the other two. This smaller position at Kemerovo would appear to be used for testing small rocket motors, an interpretation supported by the observation of different sizes among the curing buildings in the Advanced Solid Propellant Production Facility.

The uniqueness of this test facility in respect to the other five may be directly attributable to the composition of Plant 392. This plant is the only one of the previously identified major solid propellant plants that does not appear to be engaged in the production of double-base or modified double-base propellants. The 5 plants with a double-base or modified double-base propellant production area or both (i.e. Perm and Biysk) also contained test cells which appeared to be structurally complete by mid-1962.6/ At that time, the Advanced Solid Propellant Production Facility at Kemerovo was only in the mid-stage of construction, hence no large test facility was required. With the production facility virtually complete late in 1964 and capable of producing large and powerful composite-type rocket motors, a large, well-protected horizontal test position was then needed. As of [redacted] the facing of the deflector with what may be heat-resistant brick was apparently complete; the apparent removal of construction materials which had been present in [redacted] indicated that the test facility was then possibly nearing operational status.

POSSIBLE SMALL ROCKET MOTOR TEST BUILDING

The rail-served possible small rocket motor test building (item 4 and Figure 12) was first seen under construction on photography of [redacted]. The initial identification was based on the observation of 3 openings at the north end of the building, each measuring 20 by 20 feet. Very small rocket motors could be tested vertically in this building in an upside down position. This structure is comparable to the components/batch test building at Krasnoyarsk.7/

POSSIBLE INSPECTION BUILDING

The large T-shaped building (item 8) in the central section of the test facility may be used for the prefiring inspection of rocket motors. This possible inspection building is served by 3 rail spurs and contains a high-bay section [redacted]

VERTICAL ASSEMBLY/CHECKOUT BUILDING

Located in the southwest corner of the test facility is a large high-bay building (item 3) which measures [redacted] A rail- and road-served structure of this type is believed to be used for final assembly and checkout prior to testing; it would apparently be the first building in the test facility to receive the newly cast motors. The first indications of the construction of this building were visible in [redacted] it was apparently complete. Similar buildings have been identified in the test areas at Perm and Kamensk-Shakhtinskiy.5,6/

OTHER MAJOR AREAS AT PLANT 392

When the Kemerovo Ammunition Loading and Explosives Plant Raketa 392 was first observed on [redacted] photography in [redacted] it consisted of an explosives and munitions plant capable of manufacturing single-base solid propellants (i.e. smokeless powder), nitrocellulose, high-energy industrial explosives, and other related munitions. Because the areas involved in this production appeared complete when first observed, a chronological study is not possible. However, a discussion of the principal operations and structures in the various areas is presented below.

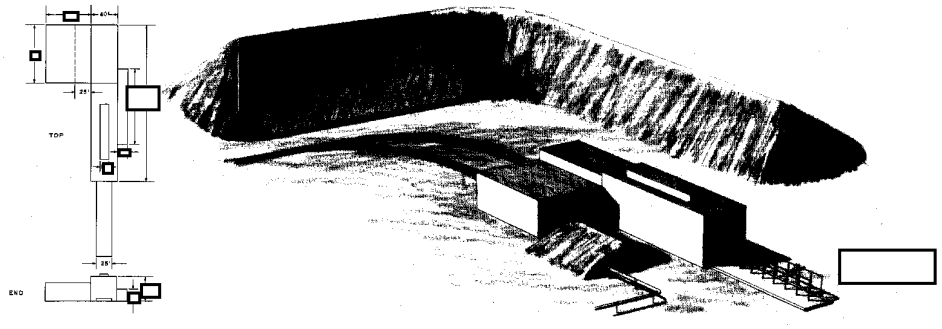

FIGURE 11. PERSPECTIVE VIEW AND DIMENSIONS OF LARGE HORIZONTAL TEST BUILDING (item 13, Figure 10).

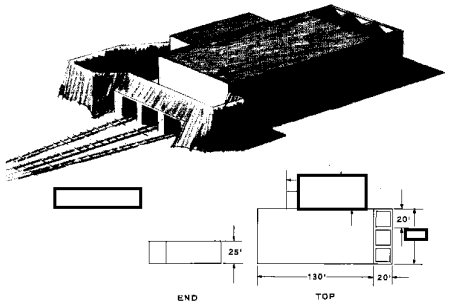

FIGURE 12. PERSPECTIVE VIEW AND DIMENSIONS OF POSSIBLE SMALL ROCKET MOTOR TEST BUILDING (item 4, Figure 10).

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Table 3. Functions and Dimensions of Structures in 2 Facilities within Plant 392
(Item numbers are keyed to Figure 14)

Item	Function	Dimensions (ft) Length Width Height	Roof Cover (sq ft)	Explanatory Notes
SINGLE-BASE SOLID PROPELLANT PLANT				
1	Support			Connected by pipeline to item 5
2	Support			Connected by pipeline to item 5
3	Prob storage			
4	Poss cellulose treatment			Connected by conveyer to item 5
5	Poss nitrator house/nitrocellulose processing			Height measured at SE corner; function may be integrated nitrocellulose processing
6	Nitrocellulose processing			
7	Cellulose treatment			Connected by conveyer to item 8
8	Poss nitrator house			Height given is maximum height above low bay on SE side; connected by conveyer to item 9
9	Poss boiling-tub house			Connected by 2 conveyers to item 10
10	Nitrocellulose processing			Height given is for high center section; connected by conveyer to item 5; flow appears to be from item 5 to item 10
11	Cooling towers			3 units with fans at top; prob induced draft
12	Support			
13	Nitrocellulose processing			
14	Support			
15	Support			
16	Prob storage			
17	Support			
18	Nitrocellulose processing			
19	Nitrocellulose processing			Protected by natural barrier of trees
20	Cellulose treatment			Connected by conveyer to item 21
21	Poss nitrator house			Height given is maximum height above low bay on SE side; connected by conveyer to item 22
22	Poss boiling-tub house			Height given is for high center section
23	Nitrocellulose processing			Height given is for high center section; connected by conveyer to item 22
24	Nitrocellulose processing			
25	Nitrocellulose processing			
26	Admin			
27	Support			
28	Nitrocellulose processing			
29	Poss dehydration/storage			Heavily revetted, prob because of hazardous pyrocotton
30	Storage			
31	Storage			
32	Support			
33	Single-base processing			
34	Support			
35	Single-base processing			
36	Single-base processing			
37	Single-base processing			
38	Single-base processing			Under construction since first observed; prob not completely in use
39	Single-base processing			
40	Single-base processing			
41	Single-base processing			Multilevel; identical to item 47
42	Support			
43	Single-base processing			
44	Single-base processing			
45	Single-base processing			
46	Single-base processing			
47	Single-base processing			Multilevel; identical to item 41
48	Storage			
49	Support			
50	Single-base processing			
51	Support			
52	Single-base processing			
53	Single-base processing			
54	Single-base processing			
55	Single-base processing			
56	Single-base processing			
57	Single-base processing			
58	Single-base processing			
59	Single-base processing			
60	Single-base processing			
61	Single-base processing			Under construction since first observed
62	Single-base processing			
63	Single-base processing			**
64	Single-base processing			
65	Single-base processing			
66	Single-base processing			**
67	Single-base processing			
68	Single-base processing			
69	Poss final blending tower			Connected by pipeline to items 47 & 72
70	Single-base processing			
71	Single-base processing			**
72	Single-base processing			
73	Single-base processing			
74	Poss final blending tower			
75	Single-base processing			
76	Single-base processing			
77	Single-base processing			
78	Single-base processing			
79	Single-base processing			
80	Single-base processing			
81	Single-base processing			**
82	Single-base processing			**
83	Single-base processing			**
84	Single-base processing			
85	Single-base processing			**
86	Single-base processing			**
87	Single-base processing			**
88	Single-base processing			**
89	Single-base processing			**
90	Single-base processing			**
91	Single-base processing			**
92	Susp final blending tower			Identical in size to item 69; however, location does not suggest same function
93	Single-base processing			**
94	Single-base processing			**
95	Single-base processing			**
96	Single-base processing			**
97	Single-base processing			**
98	Single-base processing			**
99	Single-base processing			**
100	Single-base processing			**
101	Single-base processing			**
102	Single-base processing			**
103	Single-base processing			**
104	Single-base processing			**
105	Single-base processing			**; poss still under construction, appearance unchanged since first observed
106	Single-base processing			Heavily revetted, indicating hazards requiring more than natural structural protection
107	Single-base processing			**
108	Single-base processing			**; height given is for high center section
109	Single-base processing			**
110	Single-base support			
111	Single-base support			Height given is maximum height above low SE side
112	Single-base support			
113	Single-base support			
114	Single-base processing			
115	Single-base processing			
116	Single-base processing			
117	Single-base processing			Connected by pipeline to item 126
118	Single-base processing			
119	Single-base support			Height measured at high center section
120	Poss laboratory			Earth covered, poss indicating laboratory/quality control testing
121	Single-base processing			
122	Single-base processing			
123	Single-base processing			Connected by pipeline to item 116
124	Single-base processing			
125	Single-base processing			
126	Susp final blending tower			May be final blending tower for small integrated smokeless powder line
127	Single-base processing			
128	Single-base processing			
129	Single-base processing			
POSSIBLE POLYMER PRODUCTION PLANT				
1	Support			
2	Poss pumphouse			Poss connected to item 3; connected by pipeline to SW corner of item 18
3	Poss ethyl alcohol tanks (4)			Rail served; capacity is approx 10,000 gal
4	Support			
5	Poss byproducts recovery			Center high section is [redacted] 25X1
6	Support			
7	Support			
8	Byproducts tanks (2)			May contain unreacted acetaldehyde and alcohol
9	Poss polymer propellant binder premix			Closely resembles bldg at Thiokol Chemical Corporation's Wasatch Division; 9/ height given is average overall height; high section on NE side is [redacted] 25X1
10	Support			
11	Poss mixing & milling			Height given is for high center section; 2 rail spurs enter south side
12	Poss polymerization			
13	Poss polymerization			
14	Horizontal tanks			Poss pressure vessels; may contain waste gases
15	Byproducts tank			May contain unreacted acetaldehyde and alcohol
16	Byproducts tanks (3)			Poss contain alcohol conversion byproducts
17	Poss pumphouse			Poss connected to item 16
18	Poss alcohol conversion			Height given is average overall height; high center transverse monitor is 65 ft high
19	Poss acetaldehyde conversion			Height given is for north section; several tanks/towers along west side
20	Poss polymerization			Height given is distance center section rises above low bay
21	Poss polymerization			
22	Support			
23	Support			
24	Support			Height given is for north section
25	Storage/warehouse			
26	Support			
27	Support			
28	Storage/warehouse			
29	Support			

*Overall dimension of irregular structure.
**Well-protected buildings of this type would appear to be used for crystallizing and packing powder for shipment.

NITROCELLULOSE AREA

Cellulose nitration and processing operations take place in the Nitrocellulose Area (Figures 13 and 14 and Table 3), located south of the Single-Base Solid Propellant Plant and west of the Thermal Electric Powerplant (Figure 2). The raw materials, either wood or cotton cellulose, are offloaded in a receiving and possible preliminary treatment section just south of the main nitrocellulose production section. (Equally pure cellulose may be obtained from either cotton or wood, but wood cellulose is probably more generally used in the USSR because the Soviet production of wood pulp as a raw material far exceeds cotton production.) Conveyer systems move the raw materials to 3 possible nitrator houses (items 5, 8, and 21, Figure 14) where the cellulose is mixed with nitric and sulfuric acid. Further treatment includes boiling, pulping, beating, poaching, blending, wringing, and finally dehydration. Pyrocotton or dry nitrocellulose is dangerous to handle at this stage and, therefore, is probably stored in the revetted building (item 29) in the northeast corner of the area.

SINGLE-BASE SOLID PROPELLANT PLANT

The Single-Base Solid Propellant Plant (Figures 13 and 14 and Table 3) can be divided, by function, into 2 sections. The southern section appears to receive the nitrocellulose and process it through 2 production lines; the interpretation of 2 lines is based on the presence of 2 tall possible final blending towers (items 69 and 74, Figure 14). The powder is apparently crystallized and prepared for shipment in the northern section, where the heavy growth of trees provides substantial protection for many of the buildings.

An area of revetted magazine-type bunkers northeast of the Single-Base Solid Propellant Plant (Figure 2) appears to provide storage for the final propellant product, smokeless powder, until it is shipped out by rail.

POSSIBLE POLYMER PRODUCTION PLANT

The Possible Polymer Production Plant (Figures 13 and 14) is adjacent to the single-base plant and between the Advanced Solid Propellant Production Facility and the Possible Organic Synthesis Area (Figure 2). The possible polymer plant is rail served, separately secured, and contains numerous tanks and high buildings; detailed functional and mensural data on these structures can be found in the second section of Table 3. This plant appears to have the capability to produce a rubber polymer binder, and polymer binders are used in the manufacture of composite solid propellants. It is also possible, however, that this plant could produce formaldehyde, a principal ingredient in the production of RDX, a powerful high explosive. A mixture of TNT and RDX is used in the loading of shells.

HIGH-ENERGY INDUSTRIAL EXPLOSIVES PLANT

The High-Energy Industrial Explosives Plant is located along the northeast edge of Plant 392 (Figure 2). This separately secured plant is road and rail served. Within the fenced area are 27 heavily revetted, well-separated buildings; pipeline galleries/conveyer systems connect many of the structures within the area. This plant closely resembles the Probable High-Explosives/Industrial-Explosives Production Area at the Biysk solid propellant facility. 8/ A plant of this type may be producing TNT or other high explosives.

MISCELLANEOUS AREAS

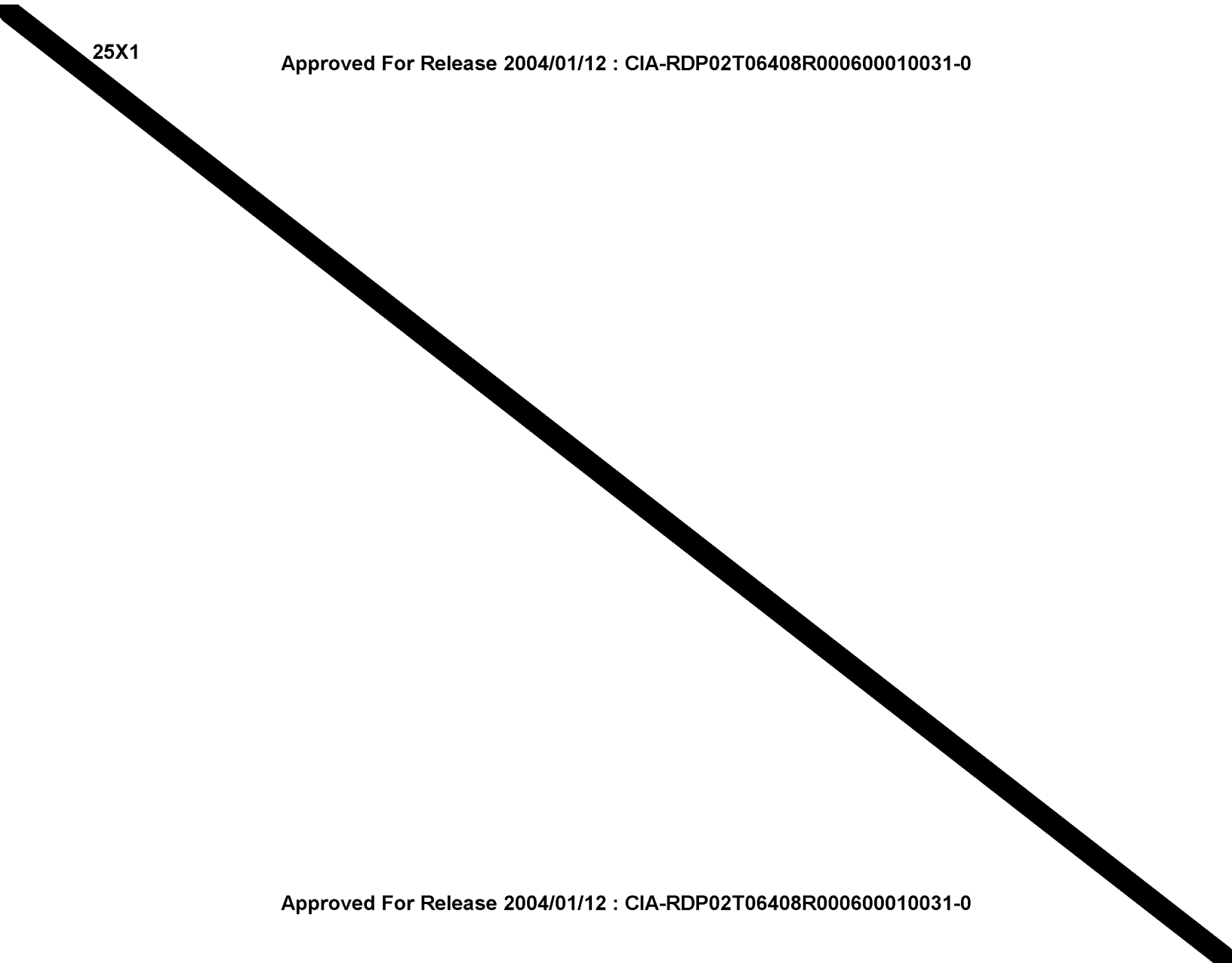
The Thermal Electric Powerplant is located southeast of the single-base plant (Figure 2). The powerplant is coal fired and uses water from the Tom River; it is rail served and probably provides the power and process steam for the entire Plant 392 complex. Within the area are a multistory boilerhouse and turbine hall, support buildings, a coal conveyer, and outdoor coal storage.

Located immediately north of the powerplant is a large group of multistory buildings interconnected by overhead pipelines and conveyer systems. No specific function can be assigned to this area at the present time; however, the pattern of buildings and pipelines indicates possible organic processing of some type. This area may support the adjacent high-energy explosives plant.

Just east of the Tom River and northwest of the advanced propellant facility are 5 small heavily revetted structures flanked on the east and west by large processing-type buildings. This area may be used for loading small-arms ammunition.

Situated north of the high-energy explosives plant and southeast of the test facility is a separately secured area containing 8 rail-served storage buildings and 1 small revetted structure. This area is possibly used for rocket motor/propellant storage.

25X1



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MAPS OR CHARTS

ACIC. US Air Target Chart, Series 200, Sheet 0161-2

ACIC. US Target Complex Chart, Series 25, Sheet 0161-9975-0-25

DOCUMENTS

25X1

1. CIA. [redacted] *emerovo Chemical Plant, "Raketa",* undated (SECRET)
2. CIA. [redacted] *emerovo Nitrate Chemical Combine #510,* undated (SECRET)
3. CIA. [redacted] *Novo Kemerovo Chemical Combine,* Jul 63 (SECRET)
4. NPIC. [redacted] *dvanced Solid Propellant Production Area, Chemical Combine No 101, Kamensk-Shakhtinskiy, USSR,* Dec 66 (TOP SECRET [redacted]
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6. NPIC. [redacted] *Solid Propellant Rocket Motor Test Facilities and Probable Solid Propellant Production Facilities, USSR,* Jun 65 (TOP SECRET [redacted]
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9. Thiokol Chemical Corp., Wasatch Division. Master Plan Drawing MP-D-93/1, Premix preparation and polymer building M-120, 4 Mar 63 (UNCLASSIFIED)

REQUIREMENT

CIA. C-DI5-82,973

NPIC PROJECT

11212/66 (partial answer)

TOP SECRET
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